

**TYPICAL PROPERTIES OF CELLULOSICS**

ASTM or UL Test	Property	Cellulose Acetate	Cellulose Propionate	Cellulose Acetate Butyrate	Ethyl Cellulose
PHYSICAL					
D792	<b>Specific gravity</b>	1.22-1.34	1.16-1.24	1.15-1.22	1.09-1.17
D792	<b>Specific volume</b> (in <sup>3</sup> /lb)	22.7-20.6	23.4-22.4	24.1-22.7	25.5-23.6
D570	<b>Water absorption</b> , 24 h, 1/8-in thk (%)	1.7-4.5	1.2-2.8	0.9-2.2	0.8-1.8
MECHANICAL					
D638	<b>Tensile strength</b> (psi)	2,200-6,900	1,400-7,200	1,400-6,200	3,000-4,800
D638	<b>Tensile modulus</b> (10 <sup>5</sup> psi)	0.65-4.0	0.6-2.15	0.5-2.0	2.2-2.5
D790	<b>Flexural strength</b> (psi)	2,500-10,400	1,700-10,600	1,800-9,250	4,700-6,800
D790	<b>Flexural modulus</b> (10 <sup>5</sup> psi)	1.2-3.6	1.15-3.7	0.9-3.0	—
D256	<b>Impact strength</b> , Izod (ft-lb/in of notch)	1.0-7.3	1.0-10.3	1.1-9.1	3.0-8.0
D785	<b>Hardness</b> , Rockwell R	To 122	To 115	To 112	79-106
THERMAL					
C177	<b>Thermal conductivity</b> (10 <sup>-4</sup> cal-cm/sec-cm <sup>2</sup> -°C)	4-8	4-8	4-8	3.8-7.0
D696	<b>Coefficient of thermal expansion</b> (10 <sup>-5</sup> in/in-°C)	8-16	11-17	11-17	10-20
D648	<b>Deflection temperature</b> (°F)				
	At 264 psi	111-195	111-228	113-202	115-190
	At 66 psi	120-209	147-250	130-227	170-180
UL 94	<b>Flammability rating</b>	V-2, HB	HB	HB	—
ELECTRICAL					
D149	<b>Dielectric strength</b> * (V/mil)				
	Short time, 1/8-in thk	250-600	300-500	250-400	350-500
D150	<b>Dielectric constant</b>				
	At 1 kHz	3.2-7.0	3.3-4.0	3.4-6.4	3.0-4.1
D150	<b>Dissipation factor</b>				
	At 1 kHz	0.01-0.10	0.01-0.05	0.01-0.04	0.002-0.020
D257	<b>Volume resistivity</b> (ohm-cm)				
	At 73°F, 50% RH	10 <sup>10</sup> -10 <sup>14</sup>	10 <sup>12</sup> -10 <sup>16</sup>	10 <sup>11</sup> -10 <sup>15</sup>	10 <sup>12</sup> -10 <sup>14</sup>
D495	<b>Arc resistance</b> (s)	50-310	175-190	—	60-80
OPTICAL					
D542	<b>Refractive index</b>	1.46-1.50	1.46-1.49	1.46-1.49	—
D1003	<b>Transmittance</b> † (%)	80-92	80-92	80-92	—

\*At 500 V/sec rate of rise. † For 1/8-in thick specimen.

**TYPICAL PROPERTIES OF CELLULOSICS**

ISO or UL Test	Property	Cellulose Acetate	Cellulose Propionate	Cellulose Acetate Butyrate	Ethyl Cellulose
PHYSICAL					
ISO1183	<b>Specific gravity</b>	1.22-1.34	1.16-1.24	1.15-1.22	1.09-1.17
ISO1183	<b>Specific volume</b> (cm <sup>3</sup> /g)	0.82-0.74	0.84-0.81	0.87-0.82	0.92-0.85
ISO62	<b>Water absorption</b> , 24 h, 3 mm thk (%)	1.7-4.5	1.2-2.8	0.9-2.2	0.8-1.8
MECHANICAL					
ISO527	<b>Tensile strength</b> (MPa)	15-48	10-50	10-43	21-33
ISO527	<b>Tensile modulus</b> (10 <sup>3</sup> MPa)	0.45-2.76	0.41-1.48	0.34-1.38	1.52-1.72
ISO178	<b>Flexural strength</b> (MPa)	17-72	12-73	12-64	32-47
ISO178	<b>Flexural modulus</b> (10 <sup>3</sup> MPa)	0.83-2.48	0.79-2.55	0.62-2.07	—
ISO180	<b>Notched Izod impact strength</b> (J/m)	53-390	53-550	59-486	160-427
ISO2039	<b>Hardness</b> , Rockwell R	To 122	To 115	To 112	79-106
THERMAL					
ISO8302	<b>Thermal conductivity</b> (W/(mK))	0.22	—	—	—
ISO11359	<b>Coefficient of thermal expansion</b> (10 <sup>-4</sup> m/m°C)	1.0-1.6	1.23-1.45	1.4-2.8	0.68-1.2
ISO75	<b>Deflection temperature</b> (°C)				
	At 1.80 MPa	43-91	43-109	45-94	46-88
	At 0.45 MPa	49-98	64-121	54-108	77-82
UL 94	<b>Flammability rating</b>	V-2, HB	HB	HB	—
ELECTRICAL					
IEC243	<b>Dielectric strength</b> * (kV/mm)				
	Short time, 3 mm thk	9.8-23.6	11.8-19.7	9.8-15.7	13.8-19.7
IEC250	<b>Dielectric constant</b>				
	At 1 kHz	3.2-7.0	3.3-4.0	3.4-6.4	3.0-4.1
IEC250	<b>Dissipation factor</b>				
	At 1 kHz	0.01-0.10	0.01-0.05	0.01-0.04	0.002-0.020
IEC93	<b>Volume resistivity</b> (ohm-cm)				
	At 23°C, 50% RH	10 <sup>10</sup> -10 <sup>14</sup>	10 <sup>12</sup> -10 <sup>16</sup>	10 <sup>11</sup> -10 <sup>15</sup>	10 <sup>12</sup> -10 <sup>14</sup>
ASTM D495	<b>Arc resistance</b> (s)	50-310	175-190	—	60-80
OPTICAL					
ISO489	<b>Refractive index</b>	1.46-1.50	1.46-1.49	1.46-1.49	—
ASTM D1003	<b>Transmittance</b> † (%)	80-92	80-92	80-92	—

\*At 500 V/sec rate of rise.